

IN THE CLAIMS

What is claimed is:

- 1 1. A magnetic head comprising:
2 a read sensor including:
3 a free layer;
4 a spacer layer;
5 a plurality of self-pinned layers, said self-pinned layers including
6 interleaved layers of ferromagnetic material and non-magnetic metal.

- 1 2. The magnetic head of claim 1, wherein:
2 said plurality of self-pinned layers includes AP1 and AP2, where AP1 includes an
3 odd number of layers of ferromagnetic material.

- 1 3. The magnetic head of claim 3, wherein:
2 said AP1 and said AP2 together have a net magnetic moment $dM=0$.

- 1 4. The magnetic head of claim 3, wherein:
2 said $dM=0$ corresponds to a dT less than 5×10^{-10} meters, where magnetic
3 thickness $T = M \times t$, and M equals magnetization, t equals thickness of material, and dT
4 is the differential in the layer thicknesses.

- 1 5. The magnetic head of claim 1, wherein:
2 said plurality of self-pinned layers has $H_k > 200$ Oe.
- 1 6. The magnetic head of claim 1, wherein:
2 said plurality of self-pinned layers is pinned by magnetostrictive anisotropy.
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2 7. The magnetic head of claim 1, wherein:
said ferromagnetic material of said plurality of self-pinned layers is chosen from a
group consisting of CoFe, CoFe/NiFe, and Fe.
- 1 8. The magnetic head of claim 1, wherein:
said non-magnetic metal of said plurality of self-pinned layers is chosen from a
group consisting of Ru, Cr, Ir, Cu, Rh, and Re.
- 1 9. The magnetic head of claim 1, wherein:
2 said read sensor is of Current Perpendicular to the Plane (CPP) configuration.
- 1 10. A disk drive comprising:
2 at least one hard disk;
3 at least one magnetic head adapted to fly over said hard disk for writing data on
4 said hard disk, and having an air bearing surface, said magnetic head including:

5 a read sensor including:
6 a free layer;
7 a spacer layer;
8 a plurality of self-pinned layers, said self-pinned layers including
9 interleaved layers of ferromagnetic material and non-magnetic metal.

1 11. The disk drive of claim 10, wherein:
2 said plurality of self-pinned layers includes AP1 and AP2, where AP1 includes an
3 odd number of layers of ferromagnetic material.

1 12. The disk drive of claim 11, wherein:
2 said AP1 and said AP2 have a net magnetic moment $dM=0$.

1 13. The disk drive of claim 12, wherein:
2 said $dM=0$ corresponds to a dT less than 5×10^{-10} meters, where magnetic
3 thickness $T = M \times t$, and M equals magnetization, t equals thickness of material, and dT
4 is the differential in the layer thicknesses.

1 14. The disk drive of claim 10, wherein:
2 said plurality of self-pinned layers has $H_k > 200$ Oe.

- 1 15. The disk drive of claim 10, wherein:
2 said plurality of self-pinned layers is pinned by magnetostrictive anisotropy.
- 1 16. The disk drive of claim 10, wherein:
2 said ferromagnetic material of said plurality of self-pinned layers is chosen from a
3 group consisting of CoFe, CoFe/NiFe, and Fe.
- 1 17. The disk drive of claim 10, wherein:
2 said non-magnetic metal of said plurality of self-pinned layers is chosen from a
3 group consisting of Ru, Cr, Ir, Cu, Rh, and Re.
- 1 18. The disk drive of claim 10, wherein:
2 said read sensor is of Current Perpendicular to the Plane (CPP) configuration.
- 1 19. A method of fabrication of a read head sensor of a magnetic head, comprising:
2 A) fabricating a plurality of self-pinned layers including interleaved layers of
3 ferromagnetic material and non-magnetic metal;
4 B) fabricating a spacer layer above said plurality of self-pinned layers; and
5 C) fabricating a free layer on said spacer layer.
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2 20. The method of fabrication of claim 19, wherein:
3 said plurality of self-pinned layers of A have $dM=0$.

1 21. The method of fabrication of claim 20, wherein:
2 said $dM=0$ corresponds to a dT less than 5×10^{-10} meters, where magnetic
3 thickness $T = M \times t$, and M equals magnetization, t equals thickness of material, and dT
4 is the differential in the layer thicknesses.

1 22. The method of fabrication of claim 19, wherein:
2 said plurality of self-pinned layers has $H_k > 200$ Oe.

1 23. The method of fabrication of claim 19, wherein:
2 said plurality of self-pinned layers is pinned by magnetostrictive anisotropy.